

1. A town has an initial population of 70000. The town's population for the next 9 years is provided below. Which type of function would be most appropriate to model the town's population?

Year	1	2	3	4	5	6	7	8	9
Pop	70017	70045	70057	70085	70097	70125	70137	70165	70177

- A. Non-Linear Power
- B. Exponential
- C. Linear
- D. Logarithmic
- E. None of the above

2. For the information below, construct a linear model that describes the total time T spent on the path in terms of the distance of a particular part of the path *if we know that all parts of the path are equal length*.

A bicyclist is training for a race on a hilly path. Their bike keeps track of their speed at any time, but not the distance traveled. Their speed traveling up a hill is 2 mph, 9 mph when traveling down a hill, and 5 mph when traveling along a flat portion.

- A. $0.811D$
- B. $16.000D$
- C. $90.000D$
- D. The model can be found with the information provided, but isn't options 1-3
- E. The model cannot be found with the information provided.

3. Using the situation below, construct a linear model that describes the cost of the coffee beans $C(h)$ in terms of the weight of the high-quality coffee beans h .

Veronica needs to prepare 230 of blended coffee beans selling for \$6.12 per pound. She has a high-quality bean that sells for \$6.92 a pound and a low-quality bean that sells for \$3.92 a pound.

- A. $C(h) = 6.92h$
- B. $C(h) = 3.00h + 901.60$
- C. $C(h) = -3.00h + 1591.60$
- D. $C(h) = 5.42h$
- E. None of the above.

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4. What is the **best** way to describe the domain of the scenario below?

Fred is a store manager at Publix. The store normally orders two pallets of water bottles a week and sells 1000 bottles per day. However, a hurricane is coming and Fred expects water bottle sales to increase tenfold for three days, then decrease by half of normal sales for four days. How many more pallets of water bottles should Fred order the week before the hurricane?

- A. Subset of the Natural numbers
- B. Proper subset of the Real numbers
- C. Subset of the Rational numbers
- D. There is no restricted domain in this scenario
- E. Subset of the Integers

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5. A town has an initial population of 50000. The town's population for the next 9 years is provided below. Which type of function would be most appropriate to model the town's population?

Year	1	2	3	4	5	6	7	8	9
Pop	49978	49966	49938	49926	49898	49886	49858	49846	49818

- A. Linear
- B. Non-Linear Power
- C. Exponential
- D. Logarithmic

E. None of the above

6. For the information below, construct a linear model that describes the total time T spent on the path in terms of the distance of a particular part of the path *if we know that all parts of the path are equal length*.

A bicyclist is training for a race on a hilly path. Their bike keeps track of their speed at any time, but not the distance traveled. Their speed traveling up a hill is 3 mph, 7 mph when traveling down a hill, and 5 mph when traveling along a flat portion.

A. $15.000D$

B. $105.000D$

C. $0.676D$

D. The model can be found with the information provided, but isn't options 1-3

E. The model cannot be found with the information provided.

7. Using the situation below, construct a linear model that describes the cost of the coffee beans $C(h)$ in terms of the weight of the low-quality coffee beans h .

Veronica needs to prepare 70 of blended coffee beans selling for \$5.39 per pound. She has a high-quality bean that sells for \$7.08 a pound and a low-quality bean that sells for \$4.76 a pound.

A. $C(h) = -2.32h + 495.60$

B. $C(h) = 5.92h$

C. $C(h) = 4.76h$

D. $C(h) = 2.32h + 333.20$

E. None of the above.

8. What is the **best** way to describe the domain of the scenario below?

Chemists commonly create a solution by mixing two products of differing concentrations together. A 10% and 30% solution can make an acid solution of some value between these, such as a 24% acid solution. The chemist wants to make differing solution percentages of 7 liters each.

- A. Proper subset of the Real numbers
- B. Subset of the Natural numbers
- C. Subset of the Rational numbers
- D. Subset of the Integers
- E. There is no restricted domain in this scenario

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9. For the information provided below, construct a linear model that describes her total budget, B , as a function of the number of months, x she is at UF.

Aubrey is a college student going into her first year at UF. She will receive Bright Futures, which covers her tuition plus a \$800 educational expense each year. Before college, Aubrey saved up \$10000. She knows she will need to pay \$1200 in rent a month, \$50 for food a week, and \$56 in other weekly expenses.

- A. $B(x) = 10800 - 1624x$
- B. $B(x) = 800x + 10000$
- C. $B(x) = 10800 - 1306x$
- D. $B(x) = 10000x + 800$
- E. None of the above.

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10. For the information provided below, construct a linear model that describes her total costs, C , as a function of the number of months, x she is at UF.

Aubrey is a college student going into her first year at UF. She will receive Bright Futures, which covers her tuition plus a \$800

educational expense each year. Before college, Aubrey saved up \$10000. She knows she will need to pay \$1200 in rent a month, \$70 for food a week, and \$40 in other weekly expenses.

- A. $C(x) = 1310x$
- B. $C(x) = 1640$
- C. $C(x) = 1310$
- D. $C(x) = 1640x$
- E. None of the above.

11. A town has an initial population of 60000. The town's population for the next 9 years is provided below. Which type of function would be most appropriate to model the town's population?

Year	1	2	3	4	5	6	7	8	9
Pop	60000	59979	59967	59958	59951	59946	59941	59937	59934

- A. Linear
- B. Non-Linear Power
- C. Logarithmic
- D. Exponential
- E. None of the above

12. For the information below, construct a linear model that describes the total time T spent on the path in terms of the distance of a particular part of the path *if we know that all parts of the path are equal length.*

A bicyclist is training for a race on a hilly path. Their bike keeps track of their speed at any time, but not the distance traveled. Their speed traveling up a hill is 4 mph, 10 mph when traveling down a hill, and 6 mph when traveling along a flat portion.

- A. $240.000D$
- B. $20.000D$

C. $0.517D$

D. The model can be found with the information provided, but isn't options 1-3

E. The model cannot be found with the information provided.

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13. Using the situation below, construct a linear model that describes the cost of the coffee beans $C(h)$ in terms of the weight of the high-quality coffee beans h .

Veronica needs to prepare 120 of blended coffee beans selling for \$4.55 per pound. She has a high-quality bean that sells for \$6.33 a pound and a low-quality bean that sells for \$3.85 a pound.

A. $C(h) = -2.48h + 759.60$

B. $C(h) = 5.09h$

C. $C(h) = 2.48h + 462.00$

D. $C(h) = 6.33h$

E. None of the above.

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14. What is the **best** way to describe the domain of the scenario below?

Bridges on highways often have expansion joints, which are small gaps in the roadway between one bridge section and the next. The gaps are put there so the bridge will have room to expand when the weather gets hot. Assume the gap width varies constantly with the temperature.

Suppose a bridge has a gap of 1.3 cm when the temperature is 22 degrees C and that the gap narrows to 0.9 cm when the temperature warms to 30 degrees C.

A. There is no restricted domain in this scenario

B. Subset of the Natural numbers

C. Proper subset of the Real numbers

D. Subset of the Integers

E. Subset of the Rational numbers

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15. A town has an initial population of 50000. The town's population for the next 9 years is provided below. Which type of function would be most appropriate to model the town's population?

Year	1	2	3	4	5	6	7	8	9
Pop	49920	49840	49680	49360	48720	47440	44880	39760	29520

- A. Exponential
 - B. Linear
 - C. Non-Linear Power
 - D. Logarithmic
 - E. None of the above
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16. For the information below, construct a linear model that describes the total time T spent on the path in terms of the distance of a particular part of the path *if we know that all parts of the path are equal length*.

A bicyclist is training for a race on a hilly path. Their bike keeps track of their speed at any time, but not the distance traveled. Their speed traveling up a hill is 4 mph, 9 mph when traveling down a hill, and 7 mph when traveling along a flat portion.

- A. $0.504D$
 - B. $252.000D$
 - C. $20.000D$
 - D. The model can be found with the information provided, but isn't options 1-3
 - E. The model cannot be found with the information provided.
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17. Using the situation below, construct a linear model that describes the cost of the coffee beans $C(h)$ in terms of the weight of the low-quality coffee beans h .

Veronica needs to prepare 140 of blended coffee beans selling for \$2.91 per pound. She has a high-quality bean that sells for \$5.07 a pound and a low-quality bean that sells for \$2.35 a pound.

- A. $C(h) = 2.72h + 329.00$
- B. $C(h) = 3.71h$
- C. $C(h) = -2.72h + 709.80$
- D. $C(h) = 2.35h$
- E. None of the above.

18. What is the **best** way to describe the domain of the scenario below?

Fred is a store manager at Publix. The store normally orders two pallets of water bottles a week and sells 1000 bottles per day. However, a hurricane is coming and Fred expects water bottle sales to increase tenfold for three days, then decrease by half of normal sales for four days. How many more pallets of water bottles should Fred order the week before the hurricane?

- A. Subset of the Rational numbers
- B. There is no restricted domain in this scenario
- C. Subset of the Natural numbers
- D. Subset of the Integers
- E. Proper subset of the Real numbers

19. For the information provided below, construct a linear model that describes her total costs, C , as a function of the number of months, x she is at UF.

Aubrey is a college student going into her first year at UF. She will receive Bright Futures, which covers her tuition plus a \$1000 educational expense each year. Before college, Aubrey saved up \$10000. She knows she will need to pay \$700 in rent a month, \$70 for food a week, and \$64 in other weekly expenses.

- A. $C(x) = 11000$
- B. $C(x) = 11000x$
- C. $C(x) = 834x$
- D. $C(x) = 834$
- E. None of the above.

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20. For the information provided below, construct a linear model that describes her total costs, C , as a function of the number of months, x she is at UF.

Aubrey is a college student going into her first year at UF. She will receive Bright Futures, which covers her tuition plus a \$400 educational expense each year. Before college, Aubrey saved up \$10000. She knows she will need to pay \$1100 in rent a month, \$70 for food a week, and \$40 in other weekly expenses.

- A. $C(x) = 1210x$
- B. $C(x) = 1540$
- C. $C(x) = 1210$
- D. $C(x) = 1540x$
- E. None of the above.

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21. A town has an initial population of 100000. The town's population for the next 9 years is provided below. Which type of function would be most appropriate to model the town's population?

Year	1	2	3	4	5	6	7	8	9
Pop	99974	99936	99906	99884	99854	99816	99786	99764	99734

- A. Logarithmic
- B. Non-Linear Power
- C. Exponential
- D. Linear

E. None of the above

22. For the information below, construct a linear model that describes the total time T spent on the path in terms of the distance of a particular part of the path *if we know that the time spent on each path was equal.*

A bicyclist is training for a race on a hilly path. Their bike keeps track of their speed at any time, but not the distance traveled. Their speed traveling up a hill is 5 mph, 10 mph when traveling down a hill, and 8 mph when traveling along a flat portion.

A. $23.000D$

B. $400.000D$

C. $0.425D$

D. The model can be found with the information provided, but isn't options 1-3

E. The model cannot be found with the information provided.

23. Using the situation below, construct a linear model that describes the cost of the coffee beans $C(h)$ in terms of the weight of the low-quality coffee beans h .

Veronica needs to prepare 100 of blended coffee beans selling for \$3.05 per pound. She has a high-quality bean that sells for \$3.57 a pound and a low-quality bean that sells for \$2.53 a pound.

A. $C(h) = 1.04h + 253.00$

B. $C(h) = 3.05h$

C. $C(h) = 2.53h$

D. $C(h) = -1.04h + 357.00$

E. None of the above.

24. What is the **best** way to describe the domain of the scenario below?

Fred is a store manager at Publix. The store normally orders two pallets of water bottles a week and sells 1000 bottles per day. However, a hurricane is coming and Fred expects water bottle sales to increase tenfold for three days, then decrease by half of normal sales for four days. How many more pallets of water bottles should Fred order the week before the hurricane?

- A. There is no restricted domain in this scenario
- B. Proper subset of the Real numbers
- C. Subset of the Rational numbers
- D. Subset of the Natural numbers
- E. Subset of the Integers

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25. A town has an initial population of 80000. The town's population for the next 9 years is provided below. Which type of function would be most appropriate to model the town's population?

Year	1	2	3	4	5	6	7	8	9
Pop	79977	79965	79937	79925	79897	79885	79857	79845	79817

- A. Linear
- B. Non-Linear Power
- C. Logarithmic
- D. Exponential
- E. None of the above

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26. For the information provided below, construct a linear model that describes the total distance of the path, D , in terms of the time spent on a particular path *if we know that all parts of the path are equal length.*

A bicyclist is training for a race on a hilly path. Their bike keeps track of their speed at any time, but not the distance traveled. Their speed traveling up a hill is 7 mph, 11 mph when traveling down a hill, and 8 mph when traveling along a flat portion.

- A. $0.359t$
 - B. $26t$
 - C. $616t$
 - D. The model can be found with the information provided, but isn't options 1-3
 - E. The model cannot be found with the information provided.
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27. Using the situation below, construct a linear model that describes the cost of the coffee beans $C(h)$ in terms of the weight of the high-quality coffee beans h .

Veronica needs to prepare 230 of blended coffee beans selling for \$4.17 per pound. She has a high-quality bean that sells for \$6.37 a pound and a low-quality bean that sells for \$3.42 a pound.

- A. $C(h) = -2.95h + 1465.10$
 - B. $C(h) = 2.95h + 786.60$
 - C. $C(h) = 6.37h$
 - D. $C(h) = 4.89h$
 - E. None of the above.
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28. What is the **best** way to describe the domain of the scenario below?

Veronica needs to prepare 170 lbs of blended coffee beans to sell for \$4.71 per pound. She has a high-quality bean that sells for \$6.00 a pound and a low-quality bean that sells for \$3.25 a pound.

- A. Subset of the Integers
- B. Subset of the Rational numbers
- C. There is no restricted domain in this scenario
- D. Proper subset of the Real numbers
- E. Subset of the Natural numbers

29. For the information provided below, construct a linear model that describes her total budget, B , as a function of the number of months, x she is at UF.

Aubrey is a college student going into her first year at UF. She will receive Bright Futures, which covers her tuition plus a \$800 educational expense each year. Before college, Aubrey saved up \$10000. She knows she will need to pay \$800 in rent a month, \$70 for food a week, and \$32 in other weekly expenses.

- A. $B(x) = 10800 - 902x$
 - B. $B(x) = 10800 - 1208x$
 - C. $B(x) = 9898x$
 - D. $B(x) = 9592x$
 - E. None of the above.
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30. For the information provided below, construct a linear model that describes her total income, I , as a function of the number of months, x she is at UF.

Aubrey is a college student going into her first year at UF. She will receive Bright Futures, which covers her tuition plus a \$600 educational expense each year. Before college, Aubrey saved up \$11000. She knows she will need to pay \$1100 in rent a month, \$60 for food a week, and \$56 in other weekly expenses.

- A. $I(x) = 1564$
 - B. $I(x) = 1216$
 - C. $I(x) = 1216x$
 - D. $I(x) = 1564x$
 - E. None of the above.
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